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(54) Title: **AQUEOUS ODOR CONTROL COMPOSITION**

(57) Abstract: An aqueous composition and method for controlling odor associated with spills of organic material which can cause odors on carpets. The method comprises applying to the surface the aqueous composition comprising one or more strains of dormant bacteria, which, when activated, is effective to control odors, one or more enzymes and non-residual surfactant. The dormant bacterial preparation is applied to organic material which can cause odors, the bacteria becoming active and digesting the organic material.



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TITLE: AQUEOUS ODOR CONTROL COMPOSITIONFIELD OF THE INVENTION

5 The present invention is directed to an aqueous odor control composition for controlling odor associated with deposits on surfaces, particularly spills of organic material on surfaces, more particularly on carpet, fabric, upholstery or other fibrous material.

10 BACKGROUND OF THE INVENTION

There are many instances where, owing to deposits of organic material on surfaces, offensive odors can arise through the presence of the organic material or its decomposition. For example, much household waste
15 contains organic material, which upon decomposition can give rise to offensive odors. This is particularly true where the household waste must be stored for a period of time prior to its disposal. Similarly, many fibrous materials utilized in household applications are also
20 susceptible to soiling by organic based material, which can give rise to offensive odors. These fibrous materials include carpet, upholstery, batting used for mattresses, pillow and pad, as well as other relatively porous surfaces encountered in the household or
25 commercial environment.

Many fibrous materials, such as acrylic, polyester, polypropylene and wool, and particularly nylon used in the manufacture of upholstery, carpets, batting
30 and household fabrics may be susceptible to staining especially from the many food dyes used in beverages and other foods as well as from other chemicals from many sources. Nylon carpet fibers are often treated with stain blockers such as a sulfonated phenol formaldehyde
35 condensate polymer, a sulfonated naphthol formaldehyde condensate polymer, a hydrolyzed vinyl aromatic maleic anhydride polymer, certain fluorochemicals or combinations thereof. The stain blockers act to prevent

or reduce the ability of organic dyes, particularly acid dye colorants from chemically reacting with and bonding to the nylon. The fibrous material, especially carpet fibers are also commonly coated with a fluorochemical anti-soiling agent to improve the anti-staining or anti-soiling characteristics of the carpet surface. The anti-soiling fluorochemicals reduce the tendency of soil to adhere to the fiber making the clean up of any spills or soil on the carpet easier. The fluorochemicals also reduce fiber watability, making for easy clean up of liquid spills through a simple process of blotting the spill. Examples of such fluorochemicals and other stain resistant chemicals are given, for example, in U.S. Patent numbers 4,680,212 and 4,925,707, the disclosures of which are incorporated herein by reference. The use of the stain blockers and fluorochemicals may not provide complete stain resistance to the carpet, as some materials may still penetrate the nylon fibers or react with the fibers, especially if left in contact with the carpet for extended periods of time. This may be especially true where the carpet is exposed to conditions such as direct sunlight or other UV sources or high traffic areas, as these conditions may cause the effectiveness of the fluorochemical and stain blocker coatings to be diminished.

In addition, especially in residential locations, the possibility of deposits of organic matter such as feces or urine from babies and pets can result in not only soiling of fibrous and other porous materials such as carpets and bedding but also a lingering odor and may, in extreme cases, require the replacement of the soiled object. In the past, various chemical compounds have been proposed to aid in removing odor in a cleaning process. Such chemicals generally act as odor inhibiting agents such as U.S. Patent No. 4,946,672 which describes the use of biguanidine polymer compositions as odor inhibiting agents. However, even in those cases where

the deposit is cleaned up and odor inhibiting agents utilized, the odor from such deposits may remain in the soiled objects and may become apparent as the effect of the odor masking agents wear off.

5

Deposits of various materials on carpet and other fibrous materials may also give rise to other concerns. Many of the deposit materials are capable of supporting microbial growth, especially in the case of feces which contains many bacteria. Some of the microbial that may grow, as a result of a deposit, may have the potential of causing disease in persons exposed to them, such as various bacteria, mold and mildew. Carpet and other fibrous material are also known to contain a number of naturally occurring bacteria and other organisms. Some of these bacteria may themselves give rise to odor due to incomplete digestion of organic material. There have been attempts to reduce the presence and number of bacteria present in carpet by utilizing various anti-microbial agents such as described in U.S. Patent Nos. 4,110,504 and 5,024,840. These agents are applied to carpet in a manner similar to the way stain blockers are applied to carpet. The use of anti-microbials, while reducing the number of bacteria associated with carpet, may raise other concerns such as the impact on human and animal health and the potential that some of the bacteria may become resistant to effects of the anti-microbials.

Many bacterial and fungal genera are known for use in odor control due to their capability for producing enzymes that are capable of breaking down organic material. Such bacteria are particularly useful where the organic material, if allowed to remain, will give rise to malodors. Several such bacterial and fungal genera such as Bacillus, Lactobacillus, Enterobacter, Streptococcus, Rhizopus, Nitrosomonas, Nitrobacter, Pseudomonas, Alcaligenes and Klebsiella, among others, are

known for use in such applications with Bacillus sp. being the most prevalent in use in various applications.

For example, European Patent Application No. 732,396 describes the use of Bacillus sp. for odor control of feedstuffs used in farming and JP Patent Application No. 7-031,668 describes their use for odor control of toilets, shoe boxes and pet litter. Other uses of the Bacillus for odor control for baby diapers and wallpaper are described in JP Patent Application Nos. 2-121,665 and 3-059,199 respectively. Preparations of sporulated Bacillus in a form suitable for spraying or otherwise distributing on a deposit, especially of pet urine and feces, on a carpet for controlling odor are presently marketed by The Bramton Company of Dallas, Texas under the trademark OUTRIGHT. The bacterial preparations are used to deodorize a deposit by application directly on the deposit. Once the deposit is deodorized, the bacteria are depleted from the site or disposed of along with the deodorized material. In the event of a new deposit on the carpet, the treatment must be repeated.

There thus remains a need for a means for treating surfaces, particularly carpet and other fibrous material to counteract the effects of deposits and especially for controlling odor associated with the deposits, particularly deposited organic material.

30 SUMMARY OF THE INVENTION

The present invention provides in one aspect for a method for controlling odor associated with deposits of organic odor causing material in contact with a surface. The method comprises applying to the organic odor causing material an aqueous composition comprising one or more strains of dormant bacteria, which, when activated, are effective to control odors, one or more enzymes and a non-residual surfactant. When the aqueous composition is

exposed to organic material that can cause odors, the bacteria associated with the aqueous composition are capable of becoming active and digesting the organic material.

5

In another aspect of the invention there is provided a composition for treating a surface, particularly a carpet, fabric or fibrous material to provide control of odor associated with deposits of organic odor causing material on the surface. The composition comprises one or more strains of dormant bacteria, which, when activated are effective to control odors, one or more enzymes, and a non-residual surfactant.

15

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is directed in one aspect to a method of controlling odor associated with deposits, particularly spills, of organic material which can cause odors on surfaces, particularly carpet or other fibrous materials. The present invention is also directed to the aqueous compositions useful for treating surfaces, particularly carpet or other fibrous material to make them capable of controlling odor as well as to the surfaces. In addition to controlling odor, the compositions may also aid in reducing the staining effects of organic material.

Many bacterial genera are known to produce enzymes that are capable of breaking down organic material. Such bacteria are particularly useful where the organic material, if allowed to remain, will give rise to malodors. Several such bacterial genera such as Bacillus, Lactobacillus, Enterobacter, Streptococcus, Nitrosomonas, Nitrobacter, Pseudomonas, Alcaligens and Klebsiella amongst others are known for use in such applications, with Bacillus and Lactobacillus sp. being

the most prevalent in use in various applications.

Strains of bacteria from any of the above noted genera are useful in practicing the present invention.

Preferably, the bacterial preparation for use in the

5 present invention is one or more strains of Bacillus or Lactobacillus. More preferably, the strains of bacteria for use in the present invention are selected from Bacillus licheniformis, Bacillus pasteurii, Bacillus laevolacticus, Bacillus megaterium and Bacillus
10 amyloliquefaciens. Each of these species has characteristics that make them most effective against particular types of organic materials. All of these species are capable of enhanced anaerobic and aerobic growth. Bacillus pasteurii is known for superior lipase
15 production, while Bacillus laevolacticus has a very fast germination cycle. Bacillus amyloliquefaciens is high in production of protease enzymes.

The selection of the strains of bacteria for use
20 in the present invention may depend upon many factors. One such factor is the nature of the organic material most commonly expected for the particular application. For example, in a commercial application, the most
25 commonly expected deposits would be soil tracked in from out-of-doors, beverages such as coffee, tea, other food and the like, especially in a restaurant environment, and possibly, inks or toners for printers and other office
equipment. Many of these materials are high in fatty components so the bacterial preparation may be enhanced
30 for strains having high activity against such materials. One example of such a bacteria is Bacillus pasteurii known for superior lipase production. In a residential environment, the nature of the deposits may differ with
out-of-doors soils, beverages, food and urine and feces
35 from pets and children being most commonly encountered. Depending upon the nature of the deposited material, the preparation may be selected to contain strains having enhanced activity against such materials. Another factor

that may affect the nature of the deposit is the geographical location of the surface being treated. This factor would especially relate to the nature of deposits of out-of-doors soil and to the nature of food deposits.

- 5 Different regions are known to have different soil types and different regions may also have differences in the foods commonly consumed due to cultural and environmental factors. In addition, the temperature of the surface to be treated will influence the activity of the bacteria.
- 10 Depending on the strain selected the bacteria will tend to exhibit enhanced activity at higher temperatures. At lower ambient temperatures, more active strains may be desired.

- 15 The bacterial preparation will typically comprise one or more strains selected from the genera and species described above. When utilizing a mixture of more than one strain, each of the individual strains may comprise between 3% and 97% of the total of the bacteria present
- 20 in the preparation. Depending upon the bacteria, these percentages are based on the total cell number or colony forming units or the total mass of the bacterial preparation. For the Bacillus sp. the percentages are based on total cell number. Preferably, each of the
- 25 strains is present in sufficient numbers to make up 10% to 70% of the total bacteria in the preparation. When mixtures of more than two strains are employed, each of the strains is most preferably present in an amount of from 20% to 40% of the total bacteria in the preparation.
- 30 Particularly preferred preparations for general use in almost all applications are as follows:

<u>% of total bacteria</u>			
Preferred			
35	<u>Species</u>	<u>Range</u>	<u>Range</u>
	<u>Bacillus megaterium</u>	5-60	20-60
	<u>Bacillus pasteurii</u>	10-40	10-30
	<u>Bacillus laevolacticus</u>	10-40	10-30

<u>Bacillus amyloliquefaciens</u>	10-40	10-30
<u>Bacillus licheniformis</u>	10-40	10-30

5 In a preferred embodiment of the present invention an effective amount of a bacterial composition comprising one or more strains selected from the group consisting of Bacillus licheniformis, Bacillus megaterium, Bacillus pasteurii, Bacillus laevolacticus and Bacillus
10 amyloliquefaciens and combinations thereof are provided in a state in which the composition may be applied to a surface, such as carpet fiber or other fibrous material. The effective amount is a sufficient number of bacteria to provide a relatively uniform coverage of the surface
15 exposed to a deposit of an odor causing organic material. The bacteria will then undergo rapid growth and consume the odor causing material. The factors that can affect the number of bacteria to be used relate in most part to the nature of the surface to be protected. For carpet,
20 such factors include the nature of the fiber in terms of the material, e.g. nylon or polypropylene and the like, the characteristics of the yarn in the terms of the denier and number of filaments and the characteristics of the fiber in terms of the number of yarns and the twist.
25 These factors relate to the nature of the carpet in terms of the weight (oz) or (g) and height of the pile. All of these factors will affect the amount of exposed surface of the fibers that might be covered by the bacterial preparation. For most applications on carpet, between
30 about 10^6 and 10^8 cells per ml of the composition is preferred.

The compositions are provided as a preparation of a suspension of the Bacillus species, one or more enzymes
35 and a non-residual surfactant in a suitable aqueous carrier, such as distilled water, tap water, a saline solution or other such aqueous solutions.

The bacteria and particularly Bacillus species are provided as dormant cells. The term "dormant cells" is intended to encompass cells which are in a state which are required to be activated before they can undergo growth. One example of a dormant cell is a sporulated form of the bacteria where the spores must undergo activation and germination before growth of the bacteria can occur.

By providing the bacteria in a dormant or sporulated form, the bacteria are protected from environmental factors which may prove detrimental to active bacterial cells. These environmental factors may include exposure to heat, chemical agents, and UV radiation from sunlight as well as the exposure to air for those strains that may be predominantly anaerobic.

The sporulated or dormant strains of bacteria become activated and undergo germination in response to being exposed to organic material including organic material that can cause odors. The factors that promote the activation of the dormant or sporulated bacteria include the moisture and various organic compounds present in the deposit of organic material. Once activated, the bacteria undergo growth and replication, consuming the organic material in the deposit until the material is depleted.

The bacterial preparation may be provided as a concentrate to be diluted with the other ingredients. The concentrate may include other agents for improving viability of the bacterial preparation. The concentrate preferably contains between 10 and 20 times the number of cells or spores per ml of the final composition. Typically, the concentrate contains about 10^9 cells per ml. The concentrate is diluted with water or other aqueous carrier and the other ingredients to produce the composition which is directly applied to the surfaces,

such as for example, installed carpet and other fibrous material.

The composition also includes other agents namely
5 one or more enzymes, and a non-residual surfactant in addition to the bacteria spore blend. The enzymes typically employed in the composition are one or more lipase or protease enzymes, particularly amylase. The non-residual surfactant is one which does not leave an
10 appreciable residue upon drying. The nature of the surfactant will be selected based upon the non-residual property. Particularly preferred surfactants are the sulfosuccinate anionic surfactants, more particularly the sodium dialkyl sulfosuccinates and most particularly
15 sodium dihexyl sulfosuccinates such as COLAWET MA-80 available from The Thornley Company, Wilmington, DE.

The aqueous odor controlling bacterial composition of the present invention may be provided with other
20 ingredients depending upon the application or surface to be treated, such as masking agents, anti-foaming agents, or foaming agents. The masking agents are generally fragrances such as vanilla or fresh scent to initially mask the odor associated with the material on the carpet.
25 The anti-foaming agent for reducing surface tension for reduced absorbent surfaces may be any commonly utilized anti-foaming agent which would be suitable for the surface to be treated. One example of such an anti-foaming agent is a silicone based anti-foaming agent,
30 which may be utilized in compositions utilized for treating reduced absorbent surfaces, such as hard surfaces. The anti-foaming agent may also be used in compositions which are utilized in a spray bottle for direct application by the consumer, particularly for
35 carpet or other fibrous material.

Another additional ingredient which may be utilized in the composition depending upon the

application is a foaming agent for producing a foam composition for treating relatively absorbent surfaces, such as carpet and other fibrous material. This foaming agent is preferably a lauryl sulphate, more preferably an ammonium lauryl sulphate or sodium lauryl sulphate, most preferably sodium lauryl sulphate. The foaming agent is utilized to produce a composition which can be applied to the surfaces of higher absorbency to allow the composition to be worked into the surface. This may be of particular use for treating carpet and other fibrous material. The additional ingredients would be utilized in the compositions at the usually employed concentrations, generally 5 percent by weight or less based upon the total weight of the composition.

For treatment of most surfaces by spraying, the aqueous odor controlling bacterial composition of the present invention are preferably formulated to have the following composition:

	Range (% of total weight)		
bacteria spore blend	3.0	to 10	
enzymes	0.1	to 5	
isopropyl alcohol	0.001	to 5.000	
masking agent	0.001	to 5.000	
surfactant	0.001	to 5.000	
acetic acid	0.001	to 5.000	adjust ph as necessary
balance water			

More preferably, the compositions of the present invention will be as follows:

	Range (% of total weight)		
bacteria spore blend	3.000	to 7.000	
enzymes	0.1	to 2.000	
isopropyl alcohol	0.01	to 4.000	
masking agent	0.01	to 1.000	
surfactant	0.01	to 1.000	
acetic acid	0.01	to 5.000	adjust ph as necessary
balance water			

A particularly preferred composition according to the present invention is as follows:

Depending upon the state of the surface material, the composition may be applied in many different ways. The composition may be applied by dipping the material in the composition or by spraying the composition onto the material. In any of these cases, once the surface material is treated with the composition, the treated material is allowed to dry by way of applied heat or simply by ambient drying.

The compositions and method of the present invention provide for effective odor control for surfaces, such as carpet. The use of the bacterial preparations, particularly the sporulated forms of Bacillus, provide for control of odor caused by deposits of organic odor causing material on surfaces such as carpets and other fibrous material. Once the deposit comes into contact with the bacteria, the bacteria germinate, and commence growing by feeding on the organic material as a food source. This bacterial growth commences within 20 minutes providing noticeable odor reduction results within 24 and 48 hours after the bacteria encounter the deposit. It is desirable to initially mask the odor using odor masking agents or neutralize the odor using odor neutralizing agents such as sodium bicarbonate or molecular sieves until the sporulated bacteria can germinate, grow and effectively decompose the odor causing agents. The composition also includes suitable protease and/or lipase enzymes to commence the digestion of the odor causing material until the bacteria commence their growth stage and can take over the digestion of the odor causing material.

(% of total weight)

35	bacteria spore blend	5		
	enzymes	1.5		
	isopropyl alcohol	1.0		
	masking agent	0.5		
40	surfactant	0.5		
	acetic acid	0.01	to	5.000
	balance water			adjust ph as necessary

The composition is applied to a surface such as an installed carpet either by way of directly spraying a soiled area with the composition or diluting the composition further with water and applying it to the carpet with a carpet cleaning machine. When applying the composition to an installed carpet, it is not essential, but preferred that the composition be applied thoroughly and evenly throughout the length of the pile, especially reaching down to the base of the pile fiber. This is generally achieved by applying an aqueous foaming bacterial preparation to the carpet and then working the fibers to improve the contact, distribution and penetration of the bacterial preparation. This is most commonly achieved by use of a pile brush operated either by hand or automatically for example, utilizing a cleaning device such as is commonly available commercially. To enhance the penetration of the bacterial preparation, the fibers of the carpet may initially be wetted through an application of a detergent solution. This is most commonly applied where the installed carpet is cleaned using a cleaning machine prior to the application of the bacterial preparation. While the carpet fibers are still moist, the bacterial preparation may be applied and worked into the carpet, utilizing the pile brush. Once the carpet has been so treated, it is dried, either by allowing it to dry in the air at ambient temperature or through the use of hot air blown through the pile of the carpet to increase the speed of drying of the carpet. It is suggested that for optimum odor control the carpet be treated with the odor controlling bacterial preparation on a routine basis such as after each wet cleaning. This can be easily accomplished after cleaning with the preparation applied to the carpet either when still wet from the cleaning or after the carpet has dried. Preferably, the preparation is applied to the carpet while still wet, worked into the

carpet with a pile brush and the carpet is allowed to dry naturally.

In addition to providing for removal of
5 potentially odor causing organic material associated with deposits on surfaces such as carpet and other fibrous material, the use of the bacterial preparations of the present invention provides other benefits. It has been found that the bacterial preparation associated with the
10 carpet fiber or other fibrous material enhances the anti-stain characteristics of the carpet. Many of the stain causing materials are organic in nature and it has been found that the bacteria can utilize such organic materials as a food source. As the bacteria consume the
15 stain causing material, the staining properties of the compounds are reduced.

The method and compositions of the present invention are especially suitable for use with carpet as
20 described in the specific examples set out above. These methods and compositions are also suitable for use with other fibrous material that may be susceptible to the effects of deposits of organic material. Examples of such other fibrous materials include rugs, upholstery
25 fabrics, automotive fabrics, bedding, clothing, etc.

For example, other fibrous materials, such as upholstery fabrics, automotive fabrics may be treated by applying the composition to the fabric by way of directly
30 spraying the soiled area with the composition or diluting the composition with water and utilizing a cleaning machine. It is preferred that the composition be applied thoroughly and evenly throughout the soiled area. This may generally be achieved by utilizing a foaming
35 preparation which is sprayed on the soiled area and then worked into the area. Alternatively, an aqueous non foaming preparation may be utilized which will be sprayed on the soiled area to completely saturate the area.

In addition to upholstery and automotive fabrics, other fibrous material such as bedding, clothing, etc., may also be treated with the aqueous compositions of the present invention to remove odor and stain associated with such fibrous materials. In these situations, the soiled area is treated with the aqueous preparation to saturate the soiled area.

10 The methods and composition of the present invention provide for an easy to use effective way of treating fibrous material to remove stain and odor causing organic materials.

15 Although various preferred embodiments of the present invention have been described herein in detail, it will be appreciated by those skilled in the art, that variations may be made thereto without departing from the spirit of the invention or the scope of the appended
20 claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A method for controlling odor associated with deposits
5 of organic material which can cause odors on surfaces,
the method comprising applying to the surface an aqueous
composition comprising one or more strains of dormant
bacteria, which, when activated, is effective to control
odors, one or more enzymes and a non-residual surfactant,
10 the dormant bacterial preparation being allowed to become
associated with the surface exposed to organic material
which can cause odors, the bacteria becoming active and
digesting the organic material.

15 2. A method as claimed in claim 1 wherein the dormant
bacteria are sporulated forms of one or more strains
selected from the bacterial genera Bacillus.

3. A method as claimed in claim 1 wherein the dormant
20 bacteria are sporulated forms of one or more strains
selected from the group of bacterial species consisting
essentially of Bacillus licheniformis, Bacillus
megaterium, Bacillus pasteurii, Bacillus laevolacticus
and Bacillus amyloliquefaciens.

25 4. A method as claimed in claim 1 wherein the surface to
be treated is carpet, fabric, upholstery, batting,
bedding or other fibrous material.

30 5. A method as claimed in claim 4 wherein the composition
comprises:

	Range (% of total weight)		
35 bacteria spore blend	3.0	to 10	
enzymes	0.1	to 5	
isopropyl alcohol	0.001	to 5.000	
masking agent	0.001	to 5.000	
surfactant	0.001	to 5.000	
40 acetic acid	0.001	to 5.000	adjust ph as necessary
balance water			

6. An aqueous odor controlling bacterial composition for surfaces to impart odor control to the surface, the composition comprising one or more strains of dormant bacteria, which when activated are effective to control odors, one or more enzymes and a non-residual surfactant.

7. An aqueous odor controlling bacterial composition as claimed in claim 6 wherein the dormant bacteria are one or more strains selected from the group of bacterial genera consisting of Bacillus, Enterobacter, Streptococcus, Nitrosomonas, Nitrobacter, Pseudomonas, Alcaligens and Klebsiella.

8. An aqueous odor controlling bacterial composition as claimed in claim 7 wherein the dormant bacteria are one or more strains selected from the group of bacterial species consisting essentially of Bacillus licheniformis, Bacillus megaterium, Bacillus pasteurii, Bacillus laevolacticus and Bacillus amyloliquefaciens.

9. An aqueous odor controlling bacterial composition as claimed in claim 8 wherein the surface to be treated is carpet fabric, upholstery, batting, bedding or other fibrous material.

10. An aqueous odor controlling bacterial composition as claimed in claim 9 wherein the composition comprises:

Range (% of total weight)	
bacteria spore blend	3.0 to 10
enzymes	0.1 to 5
isopropyl alcohol	0.001 to 5.000
masking agent	0.001 to 5.000
surfactant	0.001 to 5.000
acetic acid	0.001 to 5.000
balance water	adjust ph as necessary

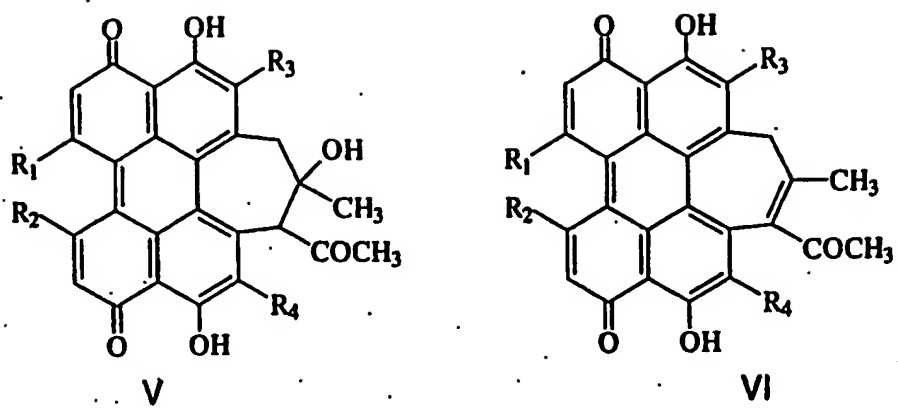


Fig. 1

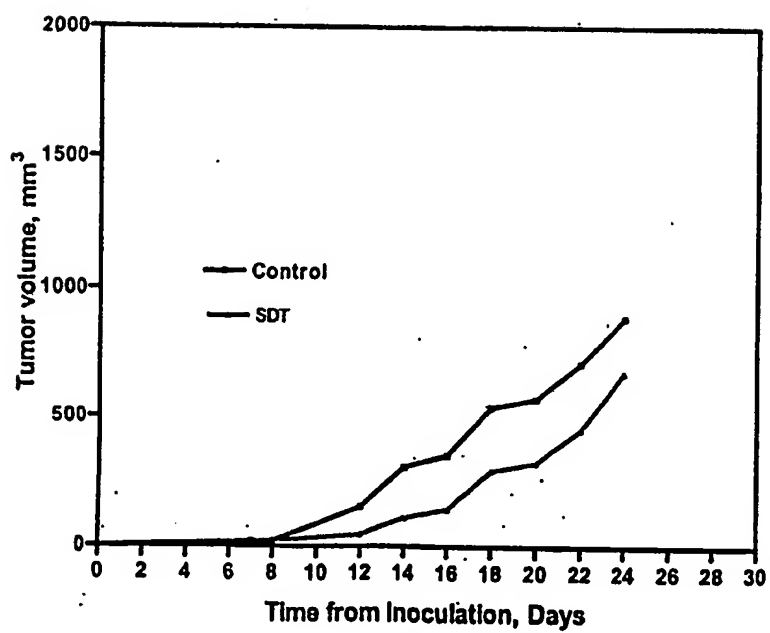


Fig. 2

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 D06M16/00 A61L9/01 D06M13/00 A01K1/015 C11D11/00
C11D3/00 C11D3/38 C11D3/386

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 D06M A61L A01K C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00 03752 A (LIFE SCIENCE TGO S R L ; CORDICK RAE ANNE (CA); FREDENBURGH JEFFREY KE) 27 January 2000 (2000-01-27) page 19, lines 17-21; claims 7-9, 18-21 -----	1-4, 6-9
X	US 5 683 575 A (MCELROY DERMOT JOSEPH ET AL) 4 November 1997 (1997-11-04) column 1, line 54 - column 2, line 25 -----	6, 7
P, X	WO 02 33035 A (TEASDALE STEVE ; LAFRANCE CORINNE (CA); 3840158 CANADA INC (CA)) 25 April 2002 (2002-04-25) the whole document ----- -/-	6



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Date of the actual completion of the international search

6 October 2003

Date of mailing of the international search report

15/10/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
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Authorized officer

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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